

# APPENDIX F

## WATERSHED INFORMATION

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## Watershed Tables

Table F-1 Watersheds in the Rain-On-Snow Zones (DNR-Managed Lands > 20 percent land base)

		Data RD3D5					
		Area		Percent of Area		Total Area	Total Percent of Area
WATERSHEDS	RAIN-ON-SNOW SUB-BASINS	0-25	>25	0-25	>25		
140102-KENNEDY-CREEK	NOT-ROS	2,476	5,809	30%	70%	8,285	100%
140102-KENNEDY-CREEK Total		2,476	5,809	30%	70%	8,285	100%
150204-LYNCH-COVE	NOT-ROS	2,533	7,669	25%	75%	10,202	100%
150204-LYNCH-COVE Total		2,533	7,669	25%	75%	10,202	100%
80303-TIGER	08030306	37	1,450	2%	98%	1,487	100%
	NOT-ROS	1,004	7,103	12%	88%	8,106	100%
80303-TIGER Total		1,041	8,553	11%	89%	9,594	100%
ASHFORD	11010901	284	808	26%	74%	1,092	100%
	11010903	628	1,558	29%	71%	2,187	100%
	11020402	16	22	42%	58%	38	100%
	11020403	5	21	19%	81%	26	100%
	11020405		5	0%	100%	5	100%
	NOT-ROS	2,024	2,256	47%	53%	4,280	100%
ASHFORD Total		2,958	4,670	39%	61%	7,628	100%
BUSY-WILD	11010901	3	29	9%	91%	31	100%
	11010903	67	92	42%	58%	159	100%
	11020402	1,516	3,659	29%	71%	5,176	100%
	11020403	663	1,699	28%	72%	2,362	100%
	11020405	627	2,241	22%	78%	2,869	100%
	NOT-ROS	1,222	2,706	31%	69%	3,928	100%
BUSY-WILD Total		4,099	10,426	28%	72%	14,525	100%
NORTH-FORK-MINERAL	11010801		15	0%	100%	15	100%
	11010905		15	0%	100%	15	100%
	11010906		12	0%	100%	12	100%
	11011201	114	1,581	7%	93%	1,695	100%
	11011202	24	905	3%	97%	929	100%
	11011203	505	3,625	12%	88%	4,130	100%

		Data RD3D5					
		Area		Percent of Area		Total Area	Total Percent of Area
WATERSHEDS	RAIN-ON-SNOW SUB-BASINS	0-25	>25	0-25	>25		
	11011204	41	1,678	2%	98%	1,719	100%
	11011205	16	1,169	1%	99%	1,185	100%
	11011206	8	786	1%	99%	794	100%
	11011207		1,294	0%	100%	1,294	100%
	NOT-ROS	271	817	25%	75%	1,088	100%
NORTH-FORK-MINERAL Total		980	11,896	8%	92%	12,876	100%
PLEASANT-VALLEY-DISP	11011304		95	0%	100%	95	100%
	NOT-ROS	119	1,146	9%	91%	1,264	100%
PLEASANT-VALLEY-DISP Total		119	1,241	9%	91%	1,359	100%
REESE-CREEK	11010801		127	0%	100%	127	100%
	11010905	8	633	1%	99%	641	100%
	11010906	484	1,288	27%	73%	1,771	100%
	11010907	195	250	44%	56%	445	100%
	11011201		50	0%	100%	50	100%
	11011202		88	0%	100%	88	100%
	NOT-ROS	601	889	40%	60%	1,490	100%
REESE-CREEK Total		1,288	3,325	28%	72%	4,613	100%
Grand Total		15,493	53,589	22%	78%	69,082	100%

**Table F-2. Land Ownership by Category for Watersheds in South Puget Planning Units with DNR Forested Trust Land Ownership**

<b>WRIA Name and Number</b>	<b>Watershed</b>	<b>Watershed Total Acres in South Puget Planning Unit<sup>1</sup></b>	<b>Percent DNR Forested Trust Land<sup>1</sup></b>	<b>Percent Federal Land<sup>1</sup></b>	<b>Percent Private Land<sup>1</sup></b>	<b>Percent Other Land<sup>1</sup></b>
WRIA 7 - Snohomish	RAGING RIVER	45	30.5	0.0	31.3	38.3
	PATTERSON CREEK	481	0.1	0.0	95.8	4.0
WRIA 8 - Cedar-Sammamish	LOWER CEDAR RIVER	35,463	0.0	0.0	72.3	27.7
	TIGER	40,523	23.2	0.0	51.7	25.1
	LAKE SAMMAMISH	18,514	0.5	0.0	94.2	5.4
	SAMMAMISH RIVER	90,838	0.3	0.1	96.3	3.3
WRIA 9 - Duwamish-Green	NORTH FORK GREEN	45,730	16.3	0.0	24.5	59.1
	HOWARD HANSEN	215	0.7	25.5	55.5	18.3
	NEWAUKUM	24,507	1.0	0.0	95.3	3.7
	LOWER GREEN-DUWAMISH	112,051	0.3	0.0	96.8	2.9
	S ELLIOTT BAY/E PASSAGE	24,191	0.1	0.0	97.3	2.6
	GRASS MOUNTAIN	106,223	17.4	3.5	70.1	9.0
	GREEN	39,284	1.6	51.5	40.9	6.0
	MIDDLE WHITE	28,021	0.0	8.0	89.6	2.5
WRIA 10 - Puyallup-White	GREENWATER	49,457	0.2	90.3	9.4	0.1
	LOWER WHITE	43,611	0.02	0.0	91.4	8.5
	SOUTH PRAIRIE	39,222	0.5	18.7	79.5	1.3
	CARBON	89,499	0.0	45.6	53.9	0.4
	ELECTRON	57,963	0.5	0.0	99.4	0.1
	NF MINERAL CREEK	0	51.1	0.0	36.0	12.8
WRIA 11 - Nisqually	TANWAX CREEK	23,180	0.0	0.0	99.7	0.3
	OHOP CREEK	27,677	0.4	0.0	92.2	7.3
	POWELL CREEK	17,489	1.6	0.0	95.6	2.8
	MUCK CREEK	79,090	0.6	43.9	55.4	0.1
	YELM CREEK	59,055	1.0	8.5	90.1	0.4
	MCALLISTER	38,142	0.1	54.1	37.7	8.1

WRIA Name and Number	Watershed	Watershed Total Acres in South Puget Planning Unit <sup>1</sup>	Percent DNR Forested Trust Land <sup>1</sup>	Percent Federal Land <sup>1</sup>	Percent Private Land <sup>1</sup>	Percent Other Land <sup>1</sup>
	ASHFORD	22,770	33.3	28.5	32.6	5.5
	BIG CATT	37,939	18.7	71.9	8.0	1.4
	BUSY WILD	56,922	25.5	0.0	64.2	10.3
	MINERAL CREEK	23,037	18.9	0.0	79.7	1.4
	NORTH FORK MINERAL	16,069	80.0	0.0	15.7	4.3
	PLEASANT VALLEY DISP	5,810	23.3	0.0	75.2	1.5
	PLEASANT VALLEY NRF	29,296	5.9	65.2	27.6	1.3
	REESE CREEK	5,035	92.1	0.0	4.2	3.7
WRIA 12 - Chambers-Clover	CHAMBERS-CLOVER	102,594	0.02	24.4	73.7	1.9
	MIDDLE DESCHUTES	37,674	0.03	0.0	99.9	0.0
	WOODLAND CREEK	34,164	0.1	0.0	97.4	2.5
	MCLANE CREEK	21,497	16.0	0.0	78.4	5.6
	LOWER DESCHUTES	52,146	0.3	10.2	87.8	1.8

WRIA Name and Number	Watershed	Watershed Total Acres in South Puget Planning Unit <sup>1</sup>	Percent DNR Forested Trust Land <sup>1</sup>	Percent Federal Land <sup>1</sup>	Percent Private Land <sup>1</sup>	Percent Other Land <sup>1</sup>
WRIA 14 - Kennedy-Goldsborough	KENNEDY CREEK	22,237	36.7	0.0	58.7	4.6
	MASON	159,887	1.6	0.0	97.3	1.1
	SQUAXIN ISLAND	1,491	20.0	0.0	0.8	79.2
	HARSTINE ISLAND	11,945	2.2	0.0	94.6	3.2
WRIA 15 - Kitsap	COLVOS PASSAGE/CARR INLET	63,538	0.6	0.4	96.4	2.6
	KEY PENINSULA	62,378	1.7	0.0	97.0	1.2
	CHICO CREEK	15,048	15.8	7.5	72.3	4.4
	DYES INLET	22,855	0.1	8.3	89.5	2.1
	LIBERTY-MILLER-APPLETREE	37,795	2.3	1.0	77.0	19.7
	GREAT BEND	54,286	27.5	0.0	68.0	4.5
	LYNCH COVE	32,877	30.9	0.0	53.8	15.3
	W KITSAP	31,457	18.9	0.2	73.6	7.2
	BANGOR-PORT GAMBLE	27,541	0.2	18.2	75.6	6.0
	VASHON ISLAND	23,009	0.2	0.9	98.7	0.2
	LOWER SKOKOMISH	3,070	1.3	0.0	98.4	0.3
	MOX CHEHALIS	27	44.9	0.0	44.9	10.2
WRIA 22 - Lower-Chehalis	LOWER SKOOKUMCHUCK	2,798	16.4	0.0	82.0	1.5
	PORTER CREEK	16	97.4	0.0	0.0	2.6
	WADDEL CREEK	51	80.7	0.0	0.0	19.3
	BLACK RIVER	1,198	2.6	0.0	96.8	0.6
WRIA 23 - Upper-Chehalis	SCATTER CREEK	318	0.9	0.0	99.1	0.0
	SILVER	5	0.6	97.8	1.6	0.0
<b>TOTALS</b>		2,109,251	6.9	12.9	74.6	5.7

<sup>1</sup> These totals do not include the "Water" land owner classification. The watershed total acres calculations were adjusted by subtracting the "Water" land owner classification and all ownership percentages were based accordingly.

Table F-3 WRIA, Watershed, DNR Ownership

WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
WRIA 7 - Snohomish	1,622	14	0.9	70408-RAGING-RIVER	45	14	0	31	30.4
				70429-PATTERSON-CREEK	486	1	0	485	0.1
WRIA 8 - Cedar-Sammamish	438,833	9,917	2.3	80303-TIGER	40,611	9,586	2,450	31,025	23.6
				80304-LAKE-SAMMAMISH	23,633	90	14	23,543	0.4
				80402-SAMMAMISH-RIVER	91,435	240	22	91,195	0.3
WRIA 9 - Duwamish-Green	372,293	26,828	7.2	NORTH-FORK-GREEN	45,817	7,456	2,141	38,361	16.3



WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
				90103-HOWARD-HANSEN	215	2	0	213	0.7
				90209-NEWAUKUM	24,568	213	8	24,355	0.9
				90301-LOWER-GREEN-DUWAMISH	116,279	6	0	116,273	0.0
				GRASS-MOUNTAIN	108,535	18,533	4,968	90,002	17.1
				GREEN	39,291	618	73	38,673	1.6
WRIA 10 - Puyallup-White	673,025	626	0.1	100204-MIDDLE-WHITE	28,031	1	0	28,030	0.0
				100205-GREENWATER	49,549	127	39	49,423	0.3

WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
				100416-SOUTH-PRAIRIE	39,290	154	1	39,136	0.4
				100418-CARBON	89,632	38	0	89,594	0.0
				100519-ELECTRON	58,531	307	30	58,224	0.5
WRIA 11 - Nisqually	490,742	55,715	11.4	110112-NF-MINERAL-CREEK	0.2	0.1	0	0.1	51.9
				110202-TANWAX-CREEK	23,794	0	0	23,794	0.0
				110203-OHOP-CREEK	28,096	122	22	27,973	0.4
				110215-POWELL-CREEK	17,826	282	101	17,544	1.6

WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
				110301-MUCK-CREEK	79,444	459	46	78,985	0.6
				110316-YELM-CREEK	59,426	610	87	58,815	1.0
				110317-MCALLISTER	40,371	26	0	40,345	0.1
				ASHFORD	23,225	7,613	2,042	15,612	32.8
				BIG-CATT	38,056	7,102	2,523	30,954	18.7
				BUSY-WILD	56,966	14,537	4,582	42,428	25.5
				MINERAL-CREEK	23,047	4,361	1,562	18,686	18.9
				NORTH-FORK-MINERAL	16,071	12,862	4,773	3,209	80.0
				PLEASANT-VALLEY-DISP	6,196	1,360	333	4,836	22.0

WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
				PLEASANT-VALLEY-NRF	31,377	1,742	747	29,636	5.6
				REESE-CREEK	5,036	4,638	1,546	397	92.1
WRIA 12 - Chambers-Clover	114,929	16	0.01	120101-CHAMBERS-CLOVER	114,930	16	0	114,914	0.0
WRIA 13 - Deschutes	185,573	12,445	6.7	130104-MIDDLE-DESCHUTES	38,025	12	1	38,012	0.0
				130201-WOODLAND-CREEK	43,393	583	294	42,810	1.3
				130202-MCLANE-CREEK	26,570	3,437	605	23,132	12.9
				130203-LOWER-	56,628	135	35	56,494	0.2

WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
				DESCHUTES					
WRIA 14 - Kennedy-Goldsborough	240,798	11,441	4.8	140102-KENNEDY-CREEK	23,309	8,277	1,417	15,032	35.5
				140101-MASON	179,007	2,602	637	176,405	1.5
				140103-SQUAXIN-ISLAND	4,050	299	63	3,752	7.4
				140104-HARSTINE-ISLAND	19,960	263	33	19,698	1.3
WRIA 15 - Kitsap	631,171	36,022	5.7	150103-COLVOS-PASSAGE/CARR-INLET	96,393	380	41	96,013	0.4
				150106-KEY-PENINSULA	83,447	1,083	147	82,364	1.3
				150107-S-SINCLAIR-	26,204	2	0	26,202	0.0

WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
				INLET					
				150108-CHICO-CREEK	18,287	2,381	529	15,906	13.0
				150109-DYES-INLET	29,195	24	1	29,171	0.1
				150110-LIBERTY-MILLER-APPLETREE	70,991	869	175	70,122	1.2
				150201-GREAT-BEND	63,516	12,298	3,266	51,217	19.4
				150201-GREAT-BEND-LK TAHUYA	63,516	2,714	615	60,802	4.3
				150202-W-KITSAP	41,871	6,026	1,398	35,845	14.4
				150203-BANGOR-PORT-	42,569	47	0	42,522	0.1

WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
				GAMBLE					
				150204- LYNCH- COVE	37,754	10,200	2,285	27,554	27.0
WRIA 16 - Skokomish- Dosewallips	3,130	40	1.3	160106- LOWER- SKOKOMIS H	3,093	40	0	3,053	1.3
WRIA 22 - Lower- Chehalis	1,021	12	1.2	220106- MOX- CHEHALIS	27	12	8	15	44.9
WRIA 23 - Upper- Chehalis	4,521	550	12.2	230404- LOWER- SKOOKUMC HUCK	2,799	460	111	2,339	16.4
				230522- PORTER- CREEK	16	15	0	0	97.4

WRIA Name and Number	WRIA Total Acres in Planning Unit	DNR Managed WRIA Total Forested Acres in Planning Unit	Percent of WRIA Acres within Planning Unit Managed for Forestry by DNR	Watershed <sup>1</sup>	Watershed Total Acres in Planning Unit	DNR Managed Forested Acres in Planning Unit	Riparian Land Class Acres in the Planning Unit	Non-DNR Managed Acres in Planning Unit	Percent of Watershed within Planning Unit Managed by DNR
				230601-WADDEL-CREEK	51	41	0	10	80.7
				230602-BLACK-RIVER	1,199	31	1	1,168	2.6
				230403-SCATTER-CREEK	318	3	0	315	0.9
<b>TOTALS</b>	3,158,294	153,627	4.86		2,291,999	145,349	39,773	2,146,650	6.3



## **Watershed Resource Inventory Area Descriptions**

### **Nisqually—WRIA 11**

The Nisqually River the primary waterbody in WRIA 11, for which DNR managed forested land constitutes approximately 11 percent of the basin. The river has a total length of approximately 72 miles and originates in the high Cascade Mountains and the Nisqually Glacier on the south slope of Mount Rainier. The entire Nisqually watershed encompasses approximately 720 square miles and contains over 331 identified streams and 715 linear miles of river and stream channels (Williams et al. 1975).

Two hydroelectric projects have been constructed in WRIA 11: (1) the Yelm Hydroelectric Project, which diverts water from a 13.5-mile reach of the mainstem Nisqually; and (2) the LaGrande Hydroelectric Project, which is currently a passage barrier to fish, although it is likely that this area was previously a natural barrier in LaGrande Canyon (WSCC 1999a).

Based on peak streamflow data for the Nisqually River at McKenna (river mile [RM] 21.8), the river most recently exceeded flood stage on February 8, 1996 (USGS 2007a). During this record flood, the Nisqually River crested at 17.13 feet (50,000 cubic feet per second [cfs]).

Watershed processes within the WRIA have been adversely affected through a variety of land use practices. Commercial timber activities have increased sediment loads, reduced large woody debris input and recruitment potential, and altered precipitation runoff patterns (WSCC 1999). The construction of the Alder and LaGrande dams, along with the conversion of pristine valley bottom lands and wetlands to agricultural purposes, and now to rural residential and hobby farms, has reduced the natural biological processes of these parcels (Williams et al. 1975; WSCC 1999).

### **Green/Duwamish—WRIA 9**

The Green/Duwamish River watershed (WRIA 9) begins in the Cascade Mountains about 30 miles northeast of Mount Rainier and flows for over 93 miles to Puget Sound at Elliott Bay in Seattle. It is bounded on the north by the Lake Washington watershed (WRIA 8) and to the south by the Puyallup watershed (WRIA 10). About 7 percent of the 372,293 acres within the basin consists of DNR managed forested land. The Duwamish River is defined as the portion of the Green/Duwamish River system from the former confluence of the Black River (RM 11.0) to Elliott Bay (RM 0.0). Historically, the White, Green, and Cedar (via the Black) Rivers flowed into the Duwamish River, and the system drained an area of over 1,600 square miles. Because of the diversion of the White River in 1911 and the Cedar River in 1916, the Green/Duwamish drainage area has been reduced to about 500 square miles (Blomberg 1995). Also, in 1913 the City of Tacoma constructed a diversion dam on the Green River, near the town of Palmer, at about RM 50.0. In 1963, the Howard Hansen Dam was built at RM 53.0. Both of these structures completely block fish migration to the upper Green River and its tributaries. Since

construction of the Howard Hansen Dam, peak streamflows in the Green River have been regulated below flood stage at the RM 32.0 gauge near Auburn, Washington (USGS 2007b).

Land uses differ considerably across the watershed and there are few watersheds in the Puget Sound basin that match the extremes evident in WRIA 9 (WSCC and King County 2000). In the Upper Green River, where most of DNR ownership is located, land is devoted almost entirely to forest production. The Middle Green River is characterized by a mix of residential, commercial forestry, and agricultural land uses while residential, industrial, and commercial uses prevail in the Lower Green River. The Duwamish River basin supports a combination of residential and industrial uses.

### **Kitsap – WRIA 15**

WRIA 15 is unique in comparison to other western Washington watersheds. The entirety of the WRIA is low elevation and low gradient. The drainages are relatively small in comparison to larger river systems, flows are dependent on rain dominated precipitation, because the drainages do not receive snowmelt runoff from either the Olympic or Cascade Mountains. Low-elevation snowmelt or rain-on-snow events during winter months are infrequent, and of much lower magnitude than events in the larger river systems that originate in the mountains.

East WRIA 15 includes the streams and marine waters on the Puget Sound side of Key Peninsula, Gig Harbor Peninsula, South Puget Sound Islands, and Kitsap Peninsula. The larger low-elevation, low-gradient drainages in East WRIA 15 include Coulter Creek, Rocky Creek, Minter Creek, Burley Creek, Crescent Creek, Curley Creek, Blackjack Creek, Gorst Creek, Chico Creek, Clear Creek, Dogfish Creek, and Grovers Creek (WSCC 2000). The National Water Information System Web Interface does not report streamflows for any of these WRIA 15 creeks (USGS 2007c).

### **Cedar-Sammamish – WRIA 8**

WRIA 8, which has the largest human population in the state, is located predominantly within the borders of King County, with 15 percent extending northward into Snohomish County. To the west WRIA 8 is bounded by Puget Sound, while to the east the headwaters of the Cedar River reach the crest of the Cascade Range near Stampede Pass. Out of the 692 square miles in WRIA 8, 607 are in the Cedar-Sammamish watershed, which contains two major river systems, the Cedar and the Sammamish, and three large lakes: Union, Washington, and Sammamish. The remainder of the WRIA consists of numerous small watersheds that drain directly to Puget Sound between Elliott Bay and Mukilteo. Lake Washington is the second largest natural lake in the state, with about 80 miles of shoreline (including about 30 miles along the shore of Mercer Island) and a surface area of about 35.6 square miles.

The Cedar-Sammamish WRIA is composed of two major physiographic areas. The eastern portion of the watershed (about 14 percent of its total area) lies in the Cascade Range while the western portion (the remaining 86 percent) occupies the Puget Sound Lowland. Largely

because of its elevation, the eastern portion (the upper Cedar River and parts of upper Issaquah Creek) receives much more precipitation, up to 102 inches annually, compared to an average of 38 inches in the western portion. The three basins in the watershed with the largest salmonid populations, the Cedar River, Bear Creek, and Issaquah Creek, are distinctly different based on geology, hydrology, and topography. Only the Cedar River, which originates in relatively high mountainous country in the Cascade Range, develops a large annual snowpack. Except for the Cedar River, all of the watershed streams must rely primarily on groundwater to sustain base flows in the summer and early fall.

### **Deschutes – WRIA 13**

Located at the southern end of Puget Sound, WRIA 13 encompasses 220 square miles and lies almost entirely within the bounds of Thurston County, with a small portion (the headwaters of the Deschutes River) in Lewis County. Approximately seven percent of the basin consists of DNR managed forest land. The drainages of WRIA 13 empty into three saltwater inlets that, in turn, define the major watersheds: Henderson Inlet to the east, centrally located Budd Inlet, and Eld Inlet to the west. The Deschutes River is the major hydrologic sub-basin in WRIA 13, with a number of other smaller independent tributaries to salt water including McLane, Green Cove, Woodland, and Woodard Creeks.

Much of the WRIA includes designated Urban Growth Areas for Olympia, Lacey, Tumwater, and Rainier, along with agriculture areas, rural residential areas, and commercial timberlands. The climate of the WRIA is typical Northwest maritime with relatively dry and cool summers and mild, wet and cloudy winters. Annual precipitation averages about 51 inches in Olympia to over 90 inches in the upper watershed (Puget Sound Cooperative River Basin Team 1990).

The Deschutes sub-basin is composed of 143 identified streams that provide over 256 linear miles of drainage over a total area of 118,773 acres (WSCC 1999b). The 52-mile-long Deschutes River and its associated tributaries represent the largest drainage system within WRIA 13. The Deschutes River drains approximately 166 square miles or about 84 percent of the total watershed (WSCC 1999b).

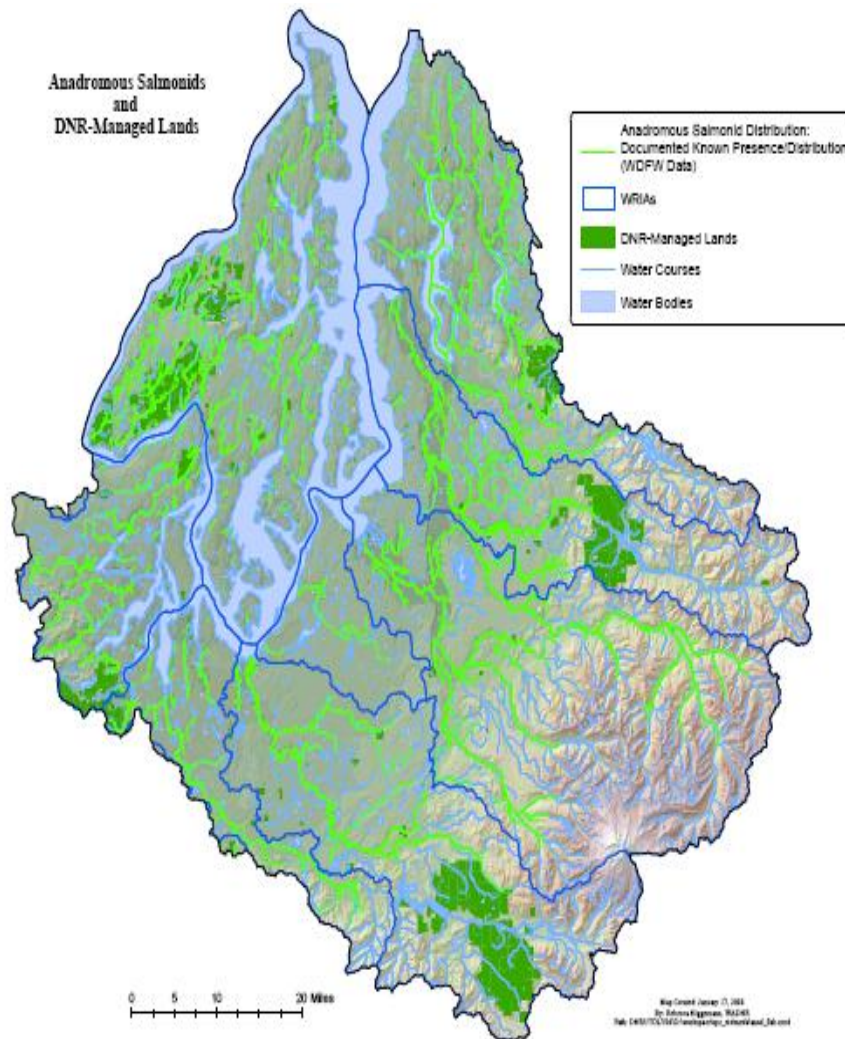
### **Kennedy-Goldsborough – WRIA 14**

WRIA 14 is divided into five sub-basins: Case Inlet, Goldsborough, Kennedy, Skookum, and South Shore. The WRIA, which has DNR managed forest land as about five percent of the land base, features an extensive network of streams that issue from springs, wetlands, small lakes, and surface water drainages. Despite its abundance of creeks, WRIA 14 has no major rivers. The streams empty into shallow bays and inlets of Puget Sound. Principal drainages include Cranberry, Goldsborough, Kennedy, Mill, Sherwood, Johns, Deer, and Skookum Creeks. Because of its low elevation, WRIA 14 receives very little snow. However, between 53 and 93 inches of rain falls each year on various parts of the watershed.

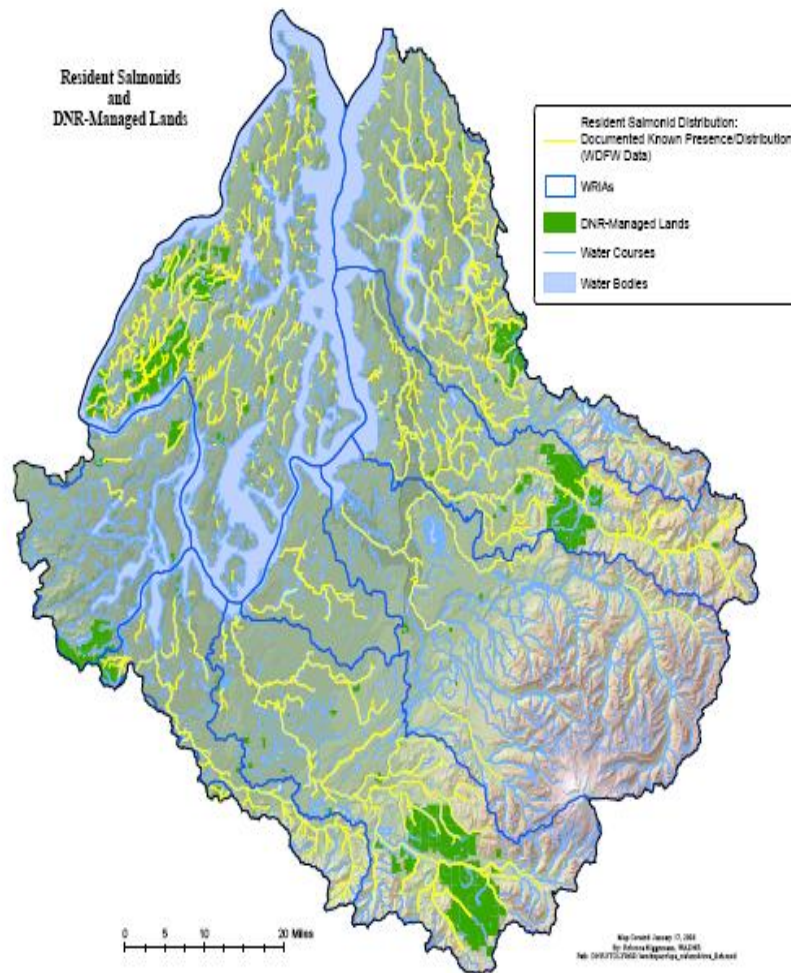
WRIA 14 streams support two species of salmon, chum and coho, as well as other salmonids such as winter steelhead and coastal cutthroat trout. These species also use nearshore areas of the WRIA, along with Chinook salmon.

A limiting factors analysis conducted for WRIA 14 (WSCC 2002) indicates that salmonid habitat has been degraded by land use practices associated with forest management, removal of large woody debris (LWD), development, and agriculture. Other issues include culvert problems, nearshore habitat and riparian degradation, loss of channel complexity, and high sedimentation levels.

## Map F-1 Anadromous Salmonids



## Map F-2 Resident Salmonids



**Map F-3 Bull Trout, Dolly Varden**

